

## **Title: Lets Spruce It Up**

### **Brief Overview:**

The students will apply measuring and geometry skills in order to determine area by partitioning a room using appropriate units and tools. They will problem solve to determine the amount of paint needed and the cost for painting the room.

### **Links to NCTM Standards:**

- **Mathematics as Problem Solving**  
Students will work cooperatively in groups to solve the problem of finding the cost of painting a room.
- **Mathematics as Communication**  
Students will use measurements, formulas, scale drawings, and write to explain and justify the process they used to complete the task.
- **Mathematics as Reasoning**  
Students will demonstrate their ability to determine and justify whether the amount of paint and the cost for the job is reasonable.
- **Mathematical Connections**  
Students will demonstrate their ability to use other resources such as the telephone book, and other outside sources to complete the task.
- **Number and Number Relationships**  
Students will determine if their final cost is sensible after completing their estimations and calculations.  
Students will set-up ratios in order to make scale drawings.
- **Geometry and Measurement**  
Students will use a standard ruler to find dimensions and then formulate areas of the room to be painted.

### **Grade/Level:**

Grades 6, 7, and 8

### **Duration/Length:**

3 to 4 class periods

### **Prerequisite Knowledge:**

Students should have working knowledge of the following skills :

- Reading a ruler
- Using a formula to find area.
- Estimation skills
- Using a ratio to set up a scale
- Rounding skills and computations with whole numbers

## **Objectives:**

Students will:

- work cooperatively in groups.
- make scale drawings.
- write to explain and justify.
- use a ruler to measure.
- calculate area.
- use outside sources to gather information.

## **Materials/Resources/Printed Materials:**

- Pencils
- Paper
- Standard ruler
- Telephone book (yellow pages)
- Calculators
- Worksheets

## **Development/Procedures:**

### **Activity Task 1 -- Class Activity**

Class selects a room and discusses what parts of each wall will not be painted.

### **Activity Task 2 -- Group Activity**

Using a standard ruler, groups will measure the lengths and widths of each wall and will measure the objects that will not be painted. Groups will complete Worksheet # 1 using the above information.

### **Activity Task 3 -- Individual Activity**

Students will set-up a scale and complete Worksheet # 2 to make a scale drawing of each wall.

### **Activity Task 4 -- Group Activity**

#### **Step A**

Each group calculates the areas for each wall. Students will then individually complete Worksheet # 3 and compare answers with the group.

#### **Step B**

Each group will use the yellow pages to set-up a list of stores and phone numbers that they can contact for the homework activity.(See activity # 5)

### **Activity Task 5 -- Individual Homework Activity**

Each student contacts at least two(2) stores to obtain information about the amount of paint needed and the cost. Students will complete Worksheet # 4 with pertinent information.

### **Activity Task 6 -- Group Activity**

Groups will share information from the homework and decide which store(s) will be used to purchase the paint and other necessary materials.

### **Activity Task 7 -- Individual Activity**

Each student will write an explanation of the process that was used to determine the final cost for the task. Be sure to include a description of how the total area was determined, the amount of paint needed, the store selected for purchases, the cost of the paint, and the costs of other necessary materials.

#### **Performance Assessment:**

##### **Activities 1, 2, 4, and 6**

non-scored

##### **Activity 3**

- scale, drawings, and labels are appropriate for activity 3 pts.
- appropriate scale, drawings, and labels are partially completed 2 pts.
- inappropriate scale, drawings, and labels 1 pt.
- no response 0 pts.

##### **Activity 5**

- homework sheet completed 2 pts.
- homework sheet incomplete 1 pt.
- no response 0 pts.

##### **Activity 7**

###### **Explanation should include:**

- 1- a description of the task
  - 2- the amount of paint needed
  - 3- the store(s) selected for the purchase
  - 4- the cost of the paint
  - 5- the cost of the other necessary materials
- explanation includes all of the above items 3 pts
  - explanation includes three or four of the above items (the cost of paint must be included as one of the items) 2 pts.
  - explanation includes two of the above items (the cost of paint must be included as one of the items) 1 pt.
  - explanation includes less than two of the above items 0 pts.

#### **Extension/Follow Up:**

- Research and write an essay to explain how various colors affect human behavior.
- Call local contractors to find what, if any, formulas are used to arrive at estimates for paint jobs.
- Have students do scale drawings of the walls in their bedrooms and calculate the total cost of having the walls painted.
- Having completed the scale drawings and calculations, write a letter that would persuade your parents to allow you to paint your bedroom.

**Authors:**

Sharon McCauley  
Roland Park Middle  
Baltimore City

Theodosia Myers  
Roland Park Middle  
Baltimore City

Alexandria Ciekot  
Roland Park Middle  
Baltimore City

Antoine Johnson  
Roland Park Middle  
Baltimore City

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**“ Let’s Spruce It Up ”****Part I**

You and your friends are tired of the shabby walls of the classrooms. You have decided to get together with your friends to spruce it up . This task will be strictly voluntary and you have a limited amount of money. Before your group decides to take on the task, you will investigate the size of the room to determine the area to be painted, the best price for the paint, and the necessary materials needed to complete the task.

- a. Your group chose to paint the \_\_\_\_\_ room.
- b. After a quick look around the room, your group estimated that the cost of the job would be \_\_\_\_\_.
- c. Your group will list below those parts of the walls (fixtures) that will not be painted.

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**Part II**

Using your ruler or yard stick, measure then list below the dimensions of each wall and the dimensions of the parts of the wall (fixtures) that will not be painted.

	<u><b>DIMENSIONS</b></u>	<u><b>NON-PAINTED FIXTURES &amp; DIMENSIONS</b></u>
<b>Wall # 1</b>	_____	_____ _____ _____ _____
<b>Wall # 2</b>	_____	_____ _____ _____ _____
<b>Wall # 3</b>	_____	_____ _____ _____ _____
<b>Wall # 4</b>	_____	_____ _____ _____ _____

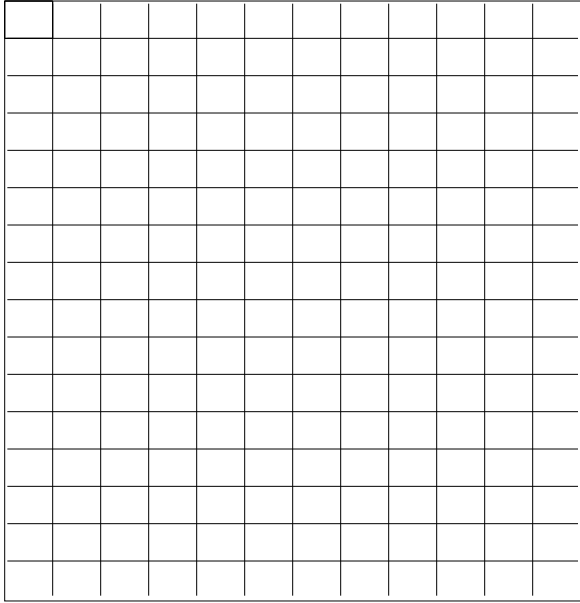
## Worksheet # 2

### “ Let’s Spruce It Up ”

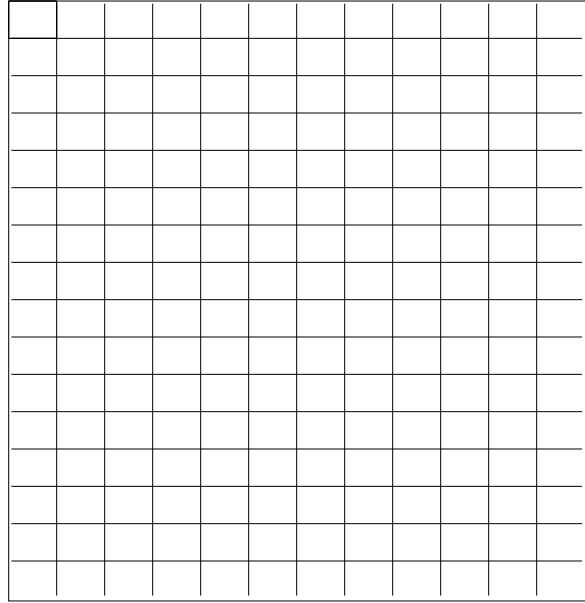
You want to make sure that you price this job accurately. In order to help you find the total area to be painted, you are going to draw pictures of the walls, including all fixtures on the walls that will not be painted. Your pictures will be scale drawings. A scale drawing is a proportional sketch of the actual dimensions of each wall. Using the grid below, determine an appropriate scale where one (1) unit on the grid will represent your scale unit.

My scale is: \_\_\_\_\_ = \_\_\_\_\_

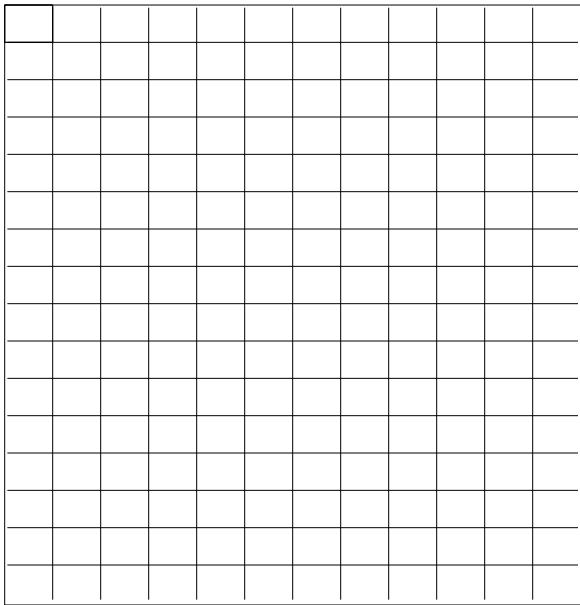
Wall # 1



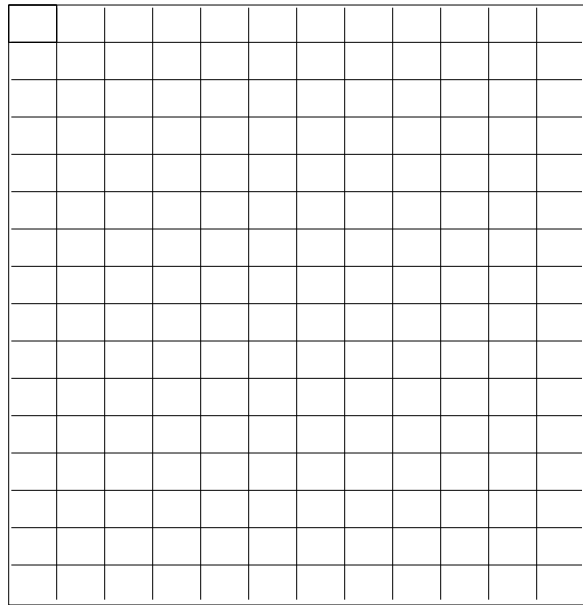
Wall # 2



Wall # 3



Wall # 4



Worksheet # 3

**“ Let’s Spruce It Up ”**

Using your actual dimensions of each wall, be sure to subtract the non-painted fixtures of each wall. Use a formula and show all steps when you calculate the areas.

Wall # 1

Wall # 2

Wall # 3

Wall # 4

Worksheet # 4

**“ Let’s Spruce It Up ”**

In order to determine the amount of paint and other necessary materials needed, and also the price of those items, you will need to contact several different sources. Complete the worksheet below with the information you received from the different sources.

Name of Source: \_\_\_\_\_

Phone number: \_\_\_\_\_

Prices of needed items: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Area covered by one can of paint: \_\_\_\_\_

Amount of paint needed: \_\_\_\_\_

Calculations:

Name of Source: \_\_\_\_\_

Phone number: \_\_\_\_\_

Prices of needed items: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Area covered by one can of paint: \_\_\_\_\_

Amount of paint needed: \_\_\_\_\_

Calculations:



**“ Let’s Spruce It Up ”**

**What was your group’s decision as to the amount of paint needed and where to make your purchase?** Now, write an explanation of the process used to determine the final cost for the task. Be sure to include a description of how the total area was determined, the amount of paint needed, the store selected for the purchases, the cost of the paint, and the cost of other necessary materials. Comment on how your original estimate compares with your final cost of this task.